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First Named Inventor	Donald Albert Paquet, Jr. Et. Al.
Art Unit	1713
Examiner Name	WILLIAM K. CHEUNG
Attorney Docket Number	FA1048USNA

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☒ Return Receipt Postcard (MPEP 503)
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Appeal Brief Under 37 CFR 41.37 (13 pages) $340.00

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	E. I. DU PONT DE NEMOURS AND COMPANY		
Signature	/John H. Lamming/		
Printed name	JOHN H. LAMMING		
Date	February 17, 2006	Reg. No.	34,857

CERTIFICATE OF TRANSMISSION/MAILING

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PATENT
Confirmation No. 3692

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF:

DONALD ALBERT PACQUET, JR. ET AL. CASE NO.: **FA1048USNA**

APPLICATION NO.: **10/617,585** GROUP ART UNIT: **1713**

FILED: **JULY 17, 2003** EXAMINER: **WILLIAM K. CHEUNG**

FOR: **TWO COMPONENT COATING COMPOSITIONS AND COATINGS PRODUCED THEREFROM**

APPEAL BRIEF UNDER 37 C.F.R. §41.37

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Commissioner for Patents
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Sir:

Responsive to the Final Office Action mailed October 20, 2005 as to the above-referenced application, a Notice of Appeal having been filed on December 20, 2005, Appellant submits the following Appeal Brief.

1. REAL PARTY IN INTEREST

The application is assigned to E.I. du Pont de Nemours and Company, Legal Patents, Barley Mill Plaza 25, Wilmington, Delaware 19880-0025, said assignment being recorded at reel 013872, frame 0484 on August 13, 2003.

2. RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any related appeals or interferences.

3. STATUS OF CLAIMS

Of claims 1-26 in the application, claims 22-25 were withdrawn from consideration pursuant to Appellant's election of species, without traverse, made in response to the Examiner's restriction requirement and claims 1-21, 26 remain pending in the application, all of which stand finally rejected.

Claims 1-21 and 26 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting over co-pending applications and also over issued U.S. patents. In their response after final rejection under 37 C.F.R. §1.116, Applicants stated that they would file a terminal disclaimer in accordance with 37 C.F.R. §1.321(c) to avoid these rejections.

Claim 5 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Claims 1-16, 18-21 and 26 stand rejected under 35 U.S.C. §102(b) as being anticipated by Barkac et al. (U.S. Patent No 6,339,126).

The Examiner has stated that claim 17 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and if the obviousness-type double patenting rejection is overcome.

The final rejection of claims 1-16, 18-21 and 26 is being appealed herein.

A copy of the pending claims is set forth in the Appendix hereto.

4. STATUS OF AMENDMENTS

No amendments to either the specification or the claims were submitted after final rejection.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER

Appellant claims two component coating compositions and coatings produced therefrom. The two components are a crosslinkable component and a crosslinking component. The crosslinkable component comprises a copolymer having on average 2 to 25 crosslinkable groups wherein the crosslinkable groups are selected from the group consisting of hydroxyl, acetoacetoxy, carboxyl, primary amine, secondary amine, epoxy, and a combination thereof. The copolymer has a weight average molecular weight in the range of from about 1000 to 4500 and a polydispersity ranging from about 1.05 to 2.5. The copolymer is polymerized from a monomer mixture comprising one or more non-functional acrylate monomers and one or more functional methacrylate monomers provided with said functional (crosslinkable) groups. The crosslinking component is selected from the group consisting of polyisocyanate, polyamine, ketimine, melamine, epoxy, polyacid, and a combination thereof. (Claim 1. Specification: page 2, line 21 to

page 3, line 3; page 4, line 25 to page 5, line 10; page 5, line 19 to page 6, line 23; page 7, lines 1-22; page 9, line 16 to page 13, line 27 [examples of suitable crosslinking components]; page 13, line 28 to page 14, line 3 and page 15, lines 5-22 [crosslinkable components]; Copolymers 1-5 (pages 21-24); Compound 1 (page 24); Crosslinking Component 1 (page 25)).

Appellant also claims two component coating compositions and coatings produced therefrom, as above, wherein the crosslinkable component is selected from the group consisting of hydroxyl, acetoacetoxy, primary amine, secondary amine, and a combination thereof, and wherein the crosslinking component is selected from the group consisting of polyisocyanate, ketimine, melamine and a combination thereof. (Claim 26, and generally the portions of the specification cited above).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Whether claim 5 is indefinite under 35 U.S.C. §112, second paragraph, on grounds that the term "non-functional" in said claim as applied to the recited Markush group of non-functional groups provided with the non-functional acrylate monomer is indefinite.

II. Whether claims 1-16, 18-21 and 26 are anticipated under 35 U.S.C. §102(b) by Barkac et al., U.S. Patent No. 6,339,126 (hereafter "Barkac").

7. ARGUMENT

I. Whether claim 5 is indefinite under 35 U.S.C. §112, second paragraph, on grounds that the term "non-functional" in said claim as applied to the recited Markush group of non-functional groups provided with the non-functional acrylate monomer is indefinite.

Claim 5 stands rejected as indefinite on grounds that the use of the term "non-functional" as applied to the recited Markush group of non-functional substituents on non-functional acrylate monomers violates the general teachings of terminologies in the pertinent art. The substituent Markush group consists of linear C_1 to C_{20} alkyl, branched C_3 to C_{20} alkyl, cyclic C_3 to C_{20} alkyl, bicyclic or polycyclic C_5 to C_{20} alkyl, aromatic with 2 to 3 rings, phenyl and C_1 to C_{20} fluorocarbon. The Examiner has argued that while an

applicant for patent has the right to be his or her own lexicographer, a definition for a term in the specification must not change the general definition known in the art.

The relevant statute, 35 U.S.C. §112, ¶ 2, requires that the claims "particularly [point] out and distinctly [claim] the subject matter which the applicant regards as his invention." The operative standard for determining whether this standard has been met is "whether those skilled in the art would understand what is claimed when the claim is read in light of the specification." *Orthokinetics Inc. v. Safety Travel Chairs Inc.*, 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (CAFC 1988). This principle of law was elucidated and explicitly affirmed in *The Beachcombers, International Inc. v. WildeWood Creative Products Inc.*, 31 F.2d 1154, 31 USPQ2d 1653, 1656 (CAFC 1994):

> The background section of the '046 specification begins with the conventional definition of the phrase "object cell": the chamber at the end of the kaleidoscope barrel opposite to the end containing the eyepiece containing movable objects such as pieces of colored glass and the like. However, the remainder of the specification clarifies that MacCarthy intended the phrase to mean something different in the context of his invention. That is perfectly acceptable. As we have repeatedly said, a patentee can be his own lexicographer provided the patentee's definition, to the extent it differs from the conventional definition, is clearly set forth in the specification. [Citation omitted]

The Examiner's position rests on the argument that certain "non-functional" substituents in the Markush group cited above contain functional groups (phenyl, fluoro, bicyclic, polycyclic, and aromatic with 2-3 rings). A conventional definition of the phrase "functional group" is found in Morrison and Boyd, *Organic Chemistry* (4th Ed., Allyn and Bacon), p. 196: "The atom or group of atoms that defines the structure of a particular family of organic compounds and, at the same time, determines their properties is called the **functional group**." The term is applied to alkenes, at page 325 of the same textbook, as follows: "The characteristic feature of the alkene structure * * * is the carbon-carbon double bond. It is thus the *functional group* of alkenes and, as the functional group, it determines the characteristic reactions that alkenes undergo."

The fallacy of the Examiner's argument is that the Examiner has taken a conventional definition of "functional group" from general organic chemistry and attempted to apply it to a specialized and particular field of polymer chemistry.

Functionality in polymer chemistry is understood to mean the average number of *reactive* functional groups per molecule (see Billmeyer, *Textbook of Polymer Science* (3rd Ed., Wiley Interscience), p. 26). The same text, p. 140, applies this terminology in a relevant context:

> The random crosslinking of double bonds bears formal resemblance to the formation of three-dimensional networks from polyfunctional monomers by stepwise polymerization. In keeping with previous nomenclature, the fraction of the monomer units on a chain that can be crosslinked is defined as q and the degree of polymerization of the chain as x. The "functionality" of the chain is its total number of vulcanizable groups qx.

In other words, functionality in polymer chemistry refers to a specific reactivity. Functional groups are those that are reactive in some way. Here, crosslinkable components are reactive to crosslinking components and are therefore *functional* because they react with the crosslinking components to form the crosslinked coating during the cure phase. By extension, functional means reactive, non-functional means non-reactive. Other chemical groups, such as fluro or phenyl are *non-functional* in this context because they are non-reactive with the crosslinkable components. The applicants are not saying that the non-functional acrylates do not contain "functional groups" as that term is generally understood in organic chemistry, but that they do not possess "functionality" as that term is understood in polymer chemistry. The application at page 7, lines 1-22 sets forth the Applicants' definition of functional and non-functional with the clarity required by *Beachcombers*. The Examiner has not objected to the Applicants' definitions on grounds of lack of clarity, but on the assertion that the definitions are somehow unconventional. As shown herein, the definitions are both clear and conventional.

Not only have the Applicants properly exercised their right to be their own lexicographers in this case, their definition of "non-functional" is in fact conventional in the context in which it is applied. A polymer chemist possessing ordinary skill in the art of crosslinked/crosslinkable coatings would not only not be confused by the Applicants' nomenclature, s/he would easily grasp the intended meaning of the nomenclature and be fully comfortable with its use.

For all of the reasons stated above, Appellant respectfully submits that claim 5 is not indefinite and, in fact, complies fully with the statute.

II. Whether Claims 1-16, 18-21 and 26 are anticipated under 35 U.S.C. §102(b) by Barkac.

In paragraph 9, page 6 (middle paragraph) of the Non-Final Office Action mailed on April 13, 2005, the Examiner correctly noted that Barkac (Col. 9, lines 32-63) shows a composition comprising both functional acrylate and functional methacrylate monomers. All of Appellant's claims, directly or indirectly, set forth as a limitation that the crosslinkable copolymer is polymerized from a monomer mixture comprising one or more non-functional acrylate monomers and one or more functional methacrylate monomers (claims 1, 26). This essential limitation (that all acrylate monomers are non-functional and that all methacrylate monomers are functional) is neither taught nor suggested by Barkac.

The application sets forth on page 6, lines 9-33, the synergies achieved by this novel combination of comonomers. The copolymerization of non-functional acrylates and functional methacrylates to form the crosslinkable component is a critical element of the present claims. This combination of comonomers in the monomer mixture used in the polymerization process ensures functionality on almost every copolymer chain, with low levels of both non-functional chains and mono- functional chains even at the low molecular weights synthesized. The combination thus avoids random polymerization, which would result in unacceptable distributions of functional (crosslinkable) groups and in high levels of undesirable non-functional and mono-functional chains. The presence of such undesirable chains will generally result in poor coating properties such as low cross-link density, high soluble fraction, low hardness, poor adhesion and poor chip and humidity resistance. On the other hand, copolymers of the invention having a T_g of greater than 10° C by using appropriate monomers result in coating compositions exhibiting desirable application viscosity, reactivity, and high crosslinkable functionality, which coatings possess improved cure time and other desirable properties. The VOC of the

resulting coating compositions, as compared to those containing conventional reactive oligomers, can be lowered without adversely affecting coating properties.

A close examination of Barkac reveals that the thermoset composition disclosed therein comprises a co-reactable solid, particulate mixture of: (a) a ß-hydroxyalkylamide crosslinking agent, and (b) a polycarboxylic acid functional polymer having at least one radically transferable group containing at least one of polymer chain of structures I or II:

$$—[(M)_p—(G)_q]_x— \qquad \text{I}$$

and

$$—[(G)_q—(M)_p]_x— \qquad \text{II.}$$

M lacks carboxylic functionality but has at least one ethylenically unsaturated radically polymerizable monomer, and G has carboxylic acid functionality and at least one ethylenically unsaturated radically polymerizable monomer. The carboxylic acid functions form covalent bonds with the ß-hydroxyalkylamide groups. Homoblock, diblock copolymer, alternative copolymer and gradient copolymer structures of formulas IV-VII are derived from formulas I and II (Col. 8, lines 16-42).

Representative components of M are set out at Co. 9, lines 32-63 and can include both acrylates and methacrylates among a number of other examples. Representative components of G are listed at Col. 10, lines 26-45 and may include both acrylates and methacrylates among a number of additional examples. Example A (Col. 20) illustrates the preparation of a carboxylic acid functional polymer useful in a thermosetting composition: the carboxylic active monomers include both acrylate (MAA) and methacrylate (MMA, n-BMA) monomers. The synthetic example of a preparation of a powder coating composition uses a mixture that contains carboxylic functional acrylate and methacrylate monomers (please see Table 2, Col. 22). Nothing in Barkac requires that only the G residue (carboxylic acid functional) may be methacrylic, and only the M residue, free of carboxylic acid functionality, may be acrylic. A critical limitation in the present claims, as stated above, is that the methacrylate monomers must be functional and the acrylate monomers must be non-functional. Barkac neither teaches nor suggests this essential requirement. Accordingly, this claim limitation is missing from the reference, and therefore, the reference does not anticipate the present claims.

The crosslinking components of the present claims are selected from polyisocyanate, polyamine, ketimine, melamine, epoxy, and polyacid, as well as mixtures of them. There is no anticipation of these limitations in the reference. The only crosslinking agent of the reference is hydroxyalkyl amide. There are no amide crosslinking components in the present claims.

For all of the foregoing reasons, claims 1-16, 18-21 and 26 are not anticipated by Barkac.

The Board of Appeals is respectfully requested to remand this application to the Examiner with a direction to allow the claims, or in the alternative to reopen prosecution so that appropriate claim amendments, if any, may be entered to place the claims in allowable form.

Respectfully submitted,

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Dated: February 17, 2006

JHL:
Enclosure

8. CLAIMS APPENDIX

1. A coating composition comprising crosslinkable and crosslinking components wherein said crosslinkable component comprises:

a copolymer having on an average 2 to 25 crosslinkable groups selected from the group consisting of hydroxyl, acetoacetoxy, carboxyl, primary amine, secondary amine, epoxy and a combination thereof; a weight average molecular weight ranging from about 1000 to 4500; a polydispersity ranging from about 1.05 to 2.5; wherein said copolymer is polymerized from a monomer mixture comprising one or more non-functional acrylate monomers and one or more functional methacrylate monomers provided with said functional groups, and

wherein said crosslinking component for said crosslinkable groups is selected from the group consisting of polyisocyanate, polyamine, ketimine, melamine, epoxy, polyacid and a combination thereof.

2. The coating composition of claim 1 wherein when said copolymer has said acetoacetoxy functional groups said crosslinking component is ketimine or polyamine.

3. The coating composition of claim 1 wherein when said copolymer has said hydroxyl functional groups said crosslinking component is polyisocyanate.

4. The coating composition of claim 1 wherein when said copolymer has said epoxy functional groups said crosslinking component is polyacid.

5. The coating composition of claim 1 wherein said non-functional acrylate monomer is provided with a non-functional group selected from the group consisting of linear C_1 to C_{20} alkyl, branched C_3 to C_{20} alkyl, cyclic C_3 to C_{20} alkyl, bicyclic or polycyclic C_5 to C_{20} alkyl, aromatic with 2 to 3 rings, phenyl and C_1 to C_{20} fluorocarbon.

6. The coating composition of claim 1 wherein said copolymer has a Tg ranging from about -10°C to 80°C.

7. The coating composition of claim 1 wherein said composition has a VOC ranging from 0.1 kilograms to 0.72 kilograms per liter.

8. The coating composition of claim 1 wherein said polyisocyanate is provided with in the range of 2 to 10 isocyanate functionalities.

9. The coating composition of claim 1 wherein said crosslinkable component further comprises a catalyst selected from the group consisting of a tin compound, tertiary amine, acid catalyst and a combination thereof.

10. The coating composition of claim 1 wherein said composition is a clear coating composition, pigmented composition, metallized coating composition, basecoat composition, monocoat composition or a primer.

11. The coating composition of claim 1 wherein said monomer mixture further comprises acid monomers.

12. The coating composition of claim 1 wherein said copolymer is provided with silane functionalities by post reacting said copolymer having said hydroxyl functionalities with isocyanatopropyl trimethoxy silane.

13. The coating composition of claim 1 wherein said monomer mixture further comprises 0.01% to 10% by weight of functional acrylate monomers.

14. The coating composition of claim 1 wherein said monomer mixture further comprises 0.01% to 10% by weight of non-functional methacrylate monomers.

15. The composition of claim 1 wherein said crosslinkable component further comprises 0.1 weight percent to 95 weight percent based on the total weight of the crosslinkable component of an acrylic polymer, a polyester, reactive oligomer, non-alicylic oligomer or a combination thereof.

16. The composition of claim 1 wherein said crosslinkable component further comprises 0.1 to 50 weight percent of a dispersed acrylic polymer, the percentage being based on the total weight of the composition solids.

17. The coating composition of claim 1 further comprising an aldimine, polyaspartic ester, or a combination thereof.

18. The coating composition of claim 1 wherein said copolymer is produced by free radical polymerization of said monomer mixture at a polymerization temperature ranging from about 120°C to 300°C.

19. The coating composition of claim 18 wherein a ratio of said non-functional acrylate monomers to said functional methacrylate monomers in said mixture ranges from about 90 : 10 :: 10 : 90.

20. The coating composition of claim 18 wherein total amount of said non-functional acrylate monomers and said functional methacrylate monomers in said monomer mixture ranges from about 100 percent to about 60 percent based on the total weight of said monomer mixture.

21. The coating composition of claim 18 wherein said free radical polymerization takes place at a reactor gage pressure ranging from 0.1 to 2.86 MPa.

26. A coating composition comprising crosslinkable and crosslinking components, wherein said crosslinkable component comprises:

a copolymer having on an average 2 to 25 crosslinkable groups selected from the group consisting of hydroxyl, acetoacetoxy, primary amine, secondary amine, and a combination thereof; a weight average molecular weight ranging from about 1000 to 4500; a polydispersity ranging from about 1.05 to 2.5; wherein said copolymer is polymerized from a monomer mixture comprising one or more non-functional acrylate monomers and one or more functional methacrylate monomers provided with said functional groups, and

wherein said crosslinking component for said crosslinkable groups is selected from the group consisting of polyisocyanate, ketimine, melamine, and a combination thereof.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.